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A Factor Analysis of Anger Ratings Assigned to Five Classes of Motivational Situations[1]

Marvin A. Iverson
Adelphi College

I. Introduction

This study was undertaken to ascertain the presence or absence of common determinants of anger ratings which individuals assign to descriptions of standard motivating conditions. More generally, the objective was to explore the dimensionality of subjects' verbalized conception of anger experience. It was believed that by studying reactions to descriptions of conditions, a useful definition could be obtained of basic variables to be considered in later investigations of subjects' anger behavior under the actual conditions themselves. In using such an approach, one assumes that unities present in subjects' ratings which relate to their anger experience will also have some counterpart in their overt anger reactions.

In the psychological literature, references to anger behavior appear in writings on the topic of motivation as well as emotion.[2] This probably results from the fact that "angry" appears to be one of several adjectives commonly applied to behaviors exhibited in different kinds of excitatory situations. Consequently, anger reactions are recorded about as often as excitatory situations are employed. Moreover, anger behavior can be identified with the numerous concepts, both motivational and emotional, which are operationally defined by different types of excitatory experimental conditions. Examples of such concepts are conflict, frustration, ego involvement, social attitudes and values, and sensory-physiological concepts of emotion. From this, the question follows whether anger responses which arise under one set of defining circumstances and are associated with a given concept have the same determinants as anger responses arising under other sets of conditions and related to other concepts. Stated differently, the question is whether anger is a phenomenon with one or several common dimensions and whether the anger-type behavior which is related to the various concepts can be arranged along one or along several common continua.

No experimental analysis of anger behavior for its common determinants has been reported. Neither has there been any attempt experimentally to link such determinants with specific features of the stimulus conditions used to arouse anger. On a broader scale, studies have been made of the dimensionality of emotional behavior (3, 5, 8, 19), but no reference has been made to any particular kind of emotional response. In these investigations the objective has usually been to define common dimensions of emotional behavior by correlating a wide variety of emotional indices (6, 9, 11, 14). The few studies which have been concerned with common dimensions as a function of the stimuli which evoke emotional responses (1, 20, 25) either have given little systematic definition to the stimuli employed or have dealt with a very limited range of stimuli. The problem then becomes one that requires subjects to react to a variety of anger-arousing laboratory conditions known to differ in systematic ways. Also it requires that subjects' reactions to these conditions be evaluated for common determinants.

The present study was intended as preliminary to a series of investigations

[1] This monograph is based on the research contained in a doctoral dissertation (13) carried out under the supervision of Dr. William A. Shaw at the University of Pennsylvania.

[2] The view that motivation and emotion should be regarded as phenomena with similar properties has been examined in detail by Leeper (15), Duffy (7), Waters and Blackwood (23), Webb (24), and Meyer (16).

bearing on this general problem. It was believed that a structure for future investigations of emotional behavior would be provided by an examination of the commonalities underlying the experience of anger which subjects associate with verbal descriptions of standardized motivational situations. Within this framework of thinking, descriptions were developed on the basis of the literature (e.g., 17, 18, 26) to represent five different types of situations wherein anger reactions were reported to occur. Also, these descriptions were chosen to represent the range of stimuli related to anger experience. Another selection requirement was that the situations possess independent characteristics. Only those situations which could be reliably discriminated in terms of definite characteristics by a group of judges were used. Thus any common determinants of anger ratings which exist could be related to independent characteristics of the situations as described.

II. Experimental Procedure

Standardization of Experimental Stimuli

Verbal descriptions of anger-arousing situations were employed as experimental stimuli. Sources for these descriptions were studies on emotion and motivation reported in the literature, lists of annoyances such as those prepared by Bennett (2) and Cason (4), and anecdotes volunteered by students in the writer's classes.

The content of the descriptions which were chosen for investigation referred to types of anger-arousing stimuli or situations which were prescribed by the following five definitions:[3]

A. *Sensory stimulation.* This class should consist of stimuli or situations wherein emotion may be aroused by either persistent, intense, or unpleasant sensory or physiological stimulation. The emotion which a person might experience in such a situation may be due to other factors as well. However, as long as physiological stimulation contributes in some direct way to the emotion aroused, the item should be included under this heading. This stimulation may be either internal or external. Also it may be contained in one of the choices in choice situations.

B. *Conflict.* This category should contain stimulus situations wherein the emotion may be due to conflicting habit patterns. The opposing habit or reaction patterns may be either mental or motor. Conflict of either the approach-approach, approach-avoidance, or avoidance-avoidance type should also be classified here. While other emotion-arousing factors may be present in an item, the distinctive feature of items in this category is that a choice is possible and explicit in resolving the conflict presented.

C. *Frustration.* This class should consist of stimulus situations wherein emotion may be produced, either wholly or in part, by barriers which prevent the reaching of specific goals. These barriers should lie outside of the mind of the person being affected; they should be more than mere mental conflict. On the other hand, the goals should be explicit and something other than mere preservation of self-esteem.

D. *Threats to self-esteem.* Situations which produce emotion because of the threats to one's self-esteem belong in this category. While the feeling aroused may be due to several factors, one element in the situation should involve a direct interference with an individual's desire to be important. This element may be contained in one of the choices in choice situations.

E. *Social mores, ethics, and taboos.* Situations wherein emotion may be produced by improper deviations from accepted social standards come under this heading. In terms of this definition, feeling may be attributed to features in the situation which offend morals, and/or taboos, or are deviations from valued social mores or social ethics, or involve legal infringements. This element may also be contained in one of the choices in choice situations. However, this category does not refer to social attitudes which are mere social niceties, courtesies, and politeness, or good manners.

These content variables were selected,

[3] Classes of content will be referred to as Variable A, Variable B, Variable C, Variable D, and Variable E in the remainder of this article.

on the basis of a review of the literature, as representing five major independent components in a so-called domain of anger behavior. Definitions of the content variables were developed initially in terms of categorical statements provided by theoretical writings. However, modifications were necessitated by the fact that the definitions had to refer to stimulus characteristics which could be reliably judged as independent. The definitions finally used in standardizing stimuli tend to be restrictive and in some cases represent only one of several meanings attributed in the psychological literature to the terms used as definition titles.

In the selection of experimental stimuli, graduate students and instructors who had more than one year of advanced graduate training in psychology served as judges. A set of 32 descriptions, believed to represent the presence and absence of the five content variables A, B, C, D, and E in all possible combinations, was preselected from a much larger bank of descriptions by five judges. These 32 items were next presented to 15 independent judges for final selection. Of the 32 descriptions, judges failed to agree sufficiently in classifying the content of eight. These eight items were then replaced by new ones on which agreement was reached by a group of 11 judges.

The rating procedure was introduced to each judge by a standard set of instructions. This was followed by a brief training period wherein the judge read one of the definitions A, B, C, D, or E at random and classified a series of sample descriptions accordingly. When it was clear to the experimenter that the judge understood the definition and the rating procedure, he presented the judge with a set of descriptions on 3 × 5 cards arranged in random order. The judge was then asked to sort items into two piles, those which represented the class of content specified in the definition and those which did not. The same procedure was continued for the remaining four definitions with the added instruction that a single description could be classified for more than one type of content.

Only items on which the proportion of agreement among judges on all five classes of content was .73 or more were regarded as a valid representation of the experimental variables. This percentage of agreement between independent ratings could not be explained as a chance occurrence.[4] The finally selected descriptions with their content identification are given in Appendix A.

B. Design of the Experiment

A factorial design which would permit use of Thurstone's complete centroid method of factor analysis (21) was chosen. Since each of the five content categories could be evaluated independently of one another, 32 different experimental stimuli which represented combinations of the presence and absence of the five types of content were possible. For example, a description could contain content Variables A and C but exclude content representing Variables B, D, and E. Similarly a description could contain content which belonged to all five categories or content which belonged to none of the five content categories. It was decided to employ 32 items which represented all 32 possible combinations of the experimental variables. These combinations were as follows (omitted letters represent absence of type of content):

O (absence of all five content categories)

A	BC	ACD	ABDE
B	BD	ACE	ACDE
C	BE	ADE	BCDE
D	CD	BCD	ABCDE
E	CE	BCE	
AB	DE	BDE	
AC	ABC	CDE	
AD	ABD	ABCD	
AE	ABE	ABCE	

The neutral, or O item, which was judged as not representing any of the

[4] The evaluation of an item for one class of content was considered as a single independent event with a 50-50 probability of occurring by chance. Therefore 73 per cent agreement among 15 judges and 82 per cent among 11 judges represented 1.96 *SD* above a 50 per cent chance frequency. All experimental stimuli met this criterion of a statistically significant percentage of interjudge agreement.

five content categories, was included to provide a standard for evaluating the effects of anger-arousing components of the other 31 descriptions.

The method of single stimuli was used to measure subjects' reactions to the verbally described situations. The following five-step rating scale was employed:

1. NOT AT ALL ANGRY—completely indifferent.
2. VERY SLIGHTLY ANGRY—slightly irritated.
3. MODERATELY ANGRY—requires some self-restraint—peeved or annoyed.
4. VERY ANGRY—requires much self-restraint.
5. EXTREMELY ANGRY—furious—so angry that you doubt your self-control—complete rage.

C. The Population Sample

A sample of 200 subjects was drawn from a population of college students in introductory psychology courses. All were white males and represented the liberal arts, commerce, and education departments at the University of Pennsylvania. No other data describing the sample were obtained.

D. Subjects' Rating Procedure

When subjects arrived at the experimental room, they were seated and handed face down a pack of 3 × 5 white cards on which were typed the 32 standardized descriptions. Five blue cards containing the rating scale were spread in ascending order in front of the subject. This was followed by a set of standard, task-orienting instructions (see Appendix B for exact wording) wherein the experimenter attempted briefly to explain the purpose of the experiment and the nature of the subject's task. An effort was also made to impress subjects with the importance of making honest, independent judgments, and with the seriousness of the experimental procedure itself. Precautions were taken to make certain that subjects understood the fact that the experimenter was interested in the items themselves and not in the ratings of individual persons.

While subjects sorted items into five piles, the experimenter appeared to be busy with other tasks in another part of the room. When subjects finished, they were asked by the experimenter not to discuss the procedure with anyone else unless that person had already participated in the experiment.

III. RESULTS

A. Treatment of Data

When the data were collected, frequency distributions with five intervals were prepared for each of the 32 experimental items. No decisive information was present to preclude the assumption that the population distributions of responses to the experimental items were normal. Therefore, to remedy skewed distributions and to avoid contingency table cells with zero or very small frequencies, all distributions were dichotomized as near the median as possible.

The data were tabulated in 2 × 2 contingency tables and tetrachoric r's were computed by using Thurstone's computing diagrams (22). The correlation coefficients were assembled in a correlation matrix (for the complete matrix, see 13). A frequency distribution of these coefficients had a mean value of .174 and a standard deviation of .152. The median coefficient was .19 and the semi-interquartile range .10. Although a considerable number of coefficients were within a zero range, 43 per cent, or almost half of the obtained r's, could be regarded as statistically significant.[5] The matrix distribution as a whole was skewed and suggested a mathematical solution for at least one major determinant.

A factor analysis was performed according to Thurstone's complete centroid method, observing the sign-reversal convention in making reflections (21). The extraction of centroid factors was

[5] The standard error of a tetrachoric r of zero was estimated as 1.5 times greater than the standard error of a Pearson product-moment r of zero (10) for a sample N of 200 ($1.5 \times \frac{1}{\sqrt{200 - 3}} = .1068$).

TABLE 1

DISTRIBUTION OF SECOND FACTOR RESIDUAL COEFFICIENTS

Residual Coefficient*	Frequency	Percentage
31 and above	1	0.2
21 to 30	10	2.0
11 to 20	69	13.9
01 to 10	140	28.0
−09 to 00	165	33.5
−19 to −10	95	19.2
−29 to −20	15	3.0
−30 and below	1	0.2
Total	496	100.0

* Decimals properly preceding entries have been omitted.

continued until (*a*) the number of statistically significant residual coefficients did not exceed that which could be accounted for on the basis of chance, (*b*) the computed standard error of the residual coefficients corresponded to the standard error of a zero *r*, and (*c*), the frequency distribution of residual coefficients did not differ significantly from a normal curve of distribution according to a chi-square test. The frequency distribution of second factor residuals is presented in Table 1. The original matrix proved to have a two-factor solution. The obtained factor loadings are given in Table 2.

A method of rotation was employed wherein the first reference axis had maximum correlation with the neutral stimulus. Thus, in the two-factor space as shown in Fig. 1, a vector was drawn to coincide with the projection of item No. 1 or the neutral item on that space. This required a counterclockwise rotation of 61° 20′. The second factor (k_2') was calculated by keeping it orthogonal to the first factor (k_1') which was extracted. Since the negative pole of Factor II (k_2') carried all the projections of the experimental items, this axis was further reflected 180° in the factor space, making all second factor loadings positive. The coordinates which resulted from the rotation are listed in Table 2, together with the communalities of each of the experimental stimuli.

An attempt was made to establish further the identity of the two finally obtained factors. This was done by correlating column weights for rotated Factors I and II with several features of the experimental items themselves. These results may be found in Table 3.

B. Findings

1. *Factor I*

The first factor which emerged as a result of rotation represented maximum correlation with the neutral stimulus. Since this coefficient was statistically significant (.354),[6] Factor I was identified as a major common determinant of ratings assigned by subjects to a stimulus which had been standardized for the absence of the five experimental variables.[7] Saturations of other items in the same factor indicated the extent to which these items shared common variance with the neutral item. Such factor loadings were statistically significant in a positive direction for almost half of the experimental stimuli.[8] The several negative loadings which emerged represent only chance deviations from zero.

2. *Factor II*

The second factor after rotation was orthogonal to the vector which corresponded to the neutral stimulus. Since

[6] The standard error of a zero correlation coefficient was estimated as .107. Therefore, a coefficient of .354 was found to exceed the .05 level of chance probability.

[7] The term *experimental variables* will refer in the remainder of this article to the five classes of content-analyzed stimuli.

[8] The term *experimental stimuli* will be used when discussing findings which relate to verbal descriptions of situations independent of the particular classes of content for which they were standardized.

TABLE 2
FACTOR MATRICES AND STIMULUS COMMUNALITIES*

Stimulus	Centroid Matrix		Rotated Matrix		Communality
	h_1	h_2	h_1'	h_2'	h^2
1 O†	170	311	354	000	125
2 A	286	413	500	053	253
3 B	538	155	395	398	314
4 C	599	−129	174	588	376
5 D	563	136	389	429	335
6 E	306	−313	−128	419	192
7 AB	338	418	529	096	289
8 AC	401	−067	134	384	165
9 AD	468	345	527	245	338
10 AE	471	−199	051	509	261
11 BC	434	096	292	334	197
12 BD	450	420	584	193	379
13 BE	442	092	293	344	204
14 CD	610	169	441	454	400
15 CE	562	015	283	486	316
16 DE	593	192	374	472	363
17 ABC	642	−158	170	639	437
18 ABD	370	−061	124	254	141
19 ABE	229	328	398	043	160
20 ACD	378	−333	−111	491	254
21 ACE	505	009	250	430	255
22 ADE	417	276	442	234	250
23 BCD	507	−081	172	484	264
24 BCE	423	−379	−130	553	323
25 BDE	399	225	389	242	210
26 CDE	350	−302	−097	453	214
27 ABCD	538	−172	108	555	319
28 ABCE	258	−141	000	294	086
29 ABDE	283	−374	−192	428	220
30 ACDE	473	−253	005	536	288
31 BCDE	532	−336	−039	628	396
32 ABCDE	487	−214	046	530	283

* Decimals properly preceding each entry have been omitted.
† Content variables are as follows: Variable A, intense and/or persistent sensory stimulation; Variable B, conflict; Variable C, frustration; Variable D, threats to self-esteem; Variable E, deviations from social mores, ethics, and taboos. Stimulus #1 represents the neutral stimulus.

the factor analysis disclosed no additional common determinants, Factor II was identified as the common dimension stipulated by the problem of the present investigation. As shown in Table 2, all experimental stimuli which represented any of the five experimental variables had a positive projection on this second reference axis. However, these projections appeared to be nonsignificant in the case of four stimuli (items No. 2, 7, 12, and 19) and suggested a slight modification of the outcome expected. Instead of all experimental stimuli sharing a significant degree of common variance along a single continuum, content Variable A (item No. 2 and certain specific combinations of variables, e.g., AB in items No. 7 and 19) appeared to be a possible exception.

Factor II, however, still seemed to indicate a general phenomenon. It

TABLE 3
INTERCORRELATIONS OF SATURATIONS IN FACTORS I AND II WITH SPECIAL CHARACTERISTICS OF THE EXPERIMENTAL STIMULI

Stimulus Characteristics	(2) Number of Words	(3) Number of Components	(4) k_1'	(5) Predicted Saturations
	Zero-Order Coefficients*			
(1) k_1'	−.516	−.510	—	−.389
(2) Number of Words		.689	.412	—
(3) Number of Components			.378	—
(4) k_2'				.634
	First-Order Coefficients			
	$r_{12.3} \cdots -.264$		$r_{15.2} \cdots -.158$	
	$r_{24.3} \cdots .227$		$r_{45.2} \cdots .532$†	
	$r_{12.2} \cdots -.248$			
	$r_{43.2} \cdots .142$			

* Zero-order coefficients were computed according to the method of rank difference. All were statistically significant at the .05 level of confidence.

† This coefficient was statistically significant at the .01 level of confidence. The other first-order coefficients were not significant.

showed significant correlation with 27 of the 31 items which were content analyzed for the presence of the five experimental variables. Also Factor II comprised more than 50 per cent of the common variance in three-fourths of the experimental stimuli (compare loadings for factors k_1' and k_2' in Table 2). The failure of the factor analysis to reveal additional group factors was another indication of generality. Thus, the experimental findings appeared to support the contention that a single common feature was contained in anger ratings assigned by subjects to a variety of stimuli standardized for anger-arousing content.

Further examination indicated that the variance which each of the five content variables shared in single component items with Factor II (i.e., loadings of items No. 2, 3, 4, 5, and 6 in k_2') could be added to predict, with accuracy better than chance, the obtained factor saturations of complex situations which combined two or more such variables. This result did not apply in the case of loadings for Factor I when account was taken of the number of words in descriptions. Thus the content variables could be said to exhibit an additive relationship with Factor II but not with Factor I. The correlational evidence for this finding is given in Table 3. Two item characteristics, the number of words and the number of variables contained in descriptions, correlated significantly with weights in both Factors I and II. However, as indicated in Table 3, these coefficients tended to vanish when the interrelationship between number of words and number of variables was nullified by partial correlation.

3. *Factorial Composition of Experimental Variables*

The relative saturations of the five content variables in Factor II may be evaluated from Fig. 1 through 6 (see Table 2 for exact rotated coordinates). On the assumption that a particular stimulus contained in an effective amount the content variable assigned

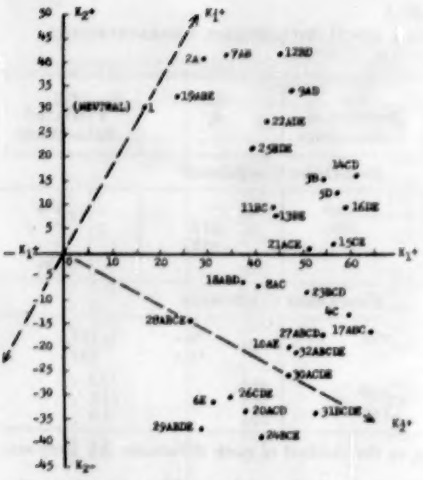

FIG. 1. Factorial composition of experimental stimuli representing all five content variables. The content variables are as follows: Variable A, sensory stimulation; Variable B, conflict; Variable C, frustration; Variable D, threats to self-esteem; and Variable E, deviations from social mores, ethics, and taboos.

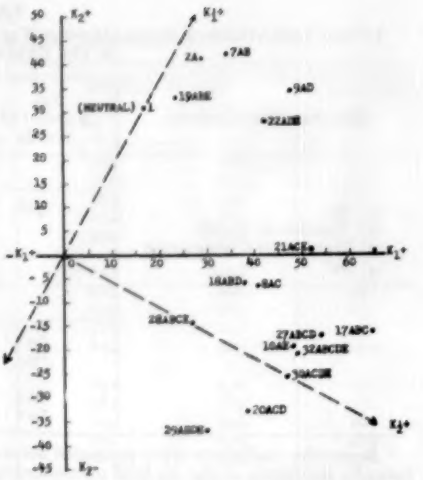

FIG. 2. Factorial composition of Variable A, sensory stimulation. Other content variables are as follows: Variable B, conflict; Variable C, frustration; Variable D, threats to self-esteem; and Variable E, deviations from social mores, ethics, and taboos.

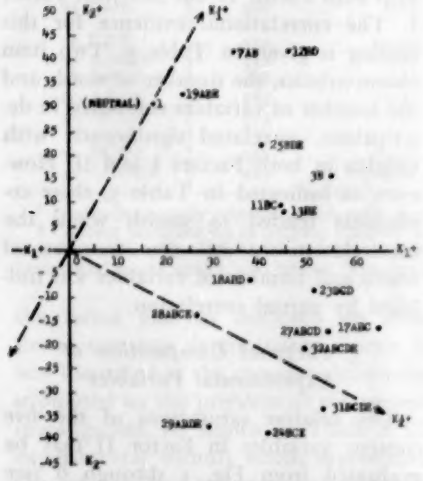

FIG. 3. Factorial composition of Variable B, conflict. Other content variables are as follows: Variable A, sensory stimulation; Variable C, frustration; Variable D, threats to self-esteem; and Variable E, deviations from social mores, ethics, and taboos.

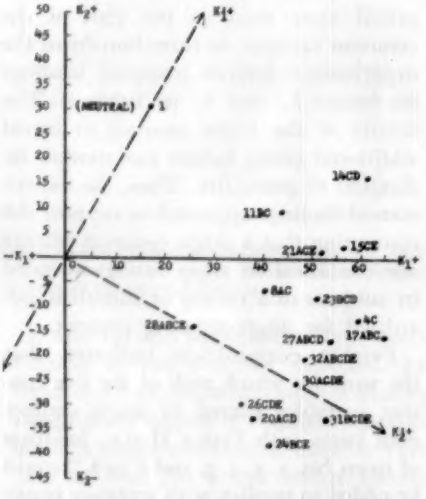

FIG. 4. Factorial composition of Variable C, frustration. Other content variables are as follows: Variable A, sensory stimulation; Variable B, conflict; Variable D, threats to self-esteem; and Variable E, deviations from social mores, ethics, and taboos.

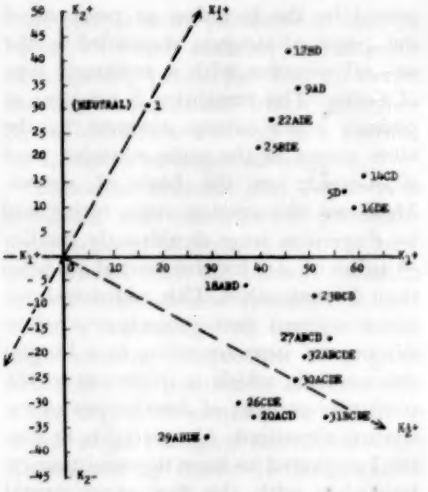

FIG. 5. Factorial composition of Variable D, threats to self-esteem. Other content variables are as follows: Variable A, sensory stimulation; Variable B, conflict: Variable C, frustration; and Variable E, deviations from social mores, ethics, and taboos.

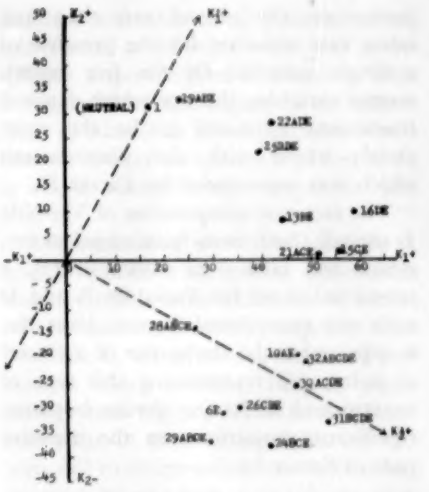

FIG. 6. Factorial composition of Variable E, deviations from social mores, ethics, and taboos. Other content variables are as follows: Variable A, sensory stimulation; Variable B, conflict; Variable C, frustration; and Variable D, threats to self-esteem.

to it, Variable A did not appear to contribute significantly to Factor II. This class of content labeled *intense and/or persistent sensory stimulation* as isolated in item No. 2 (see Fig. 2) showed only a chance relationship with Factor II. Furthermore, this class of content was contained in three of the four experimental stimuli which failed to correlate significantly with the second factor. Its common variance appeared to be more closely allied with that of Factor I. If any relationship existed at all between Variable A and Factor II, it most likely occurred when Variable A was combined with other types of content. This would explain the relatively high loadings in Factor II of stimuli which were standardized for Variables A and E (item No. 10) and Varibles A and C (item No. 8).

Content Variables B (conflict) and D (threats to self-esteem) seemed to function similarly in relation to the second reference axis. Stimuli wherein these classes of content were single determinants (items No. 3 and 5) occupied approximately the same substantial positions in the factor space (see Fig. 1). Distributions over the factor space of stimuli which contained one of these components in combination with others were also comparable. The two separate distributions are given in Fig. 3 and 5, respectively.

As can be observed in Fig. 4, experimental items which represented content Variable C (irresolvable frustration) clustered the most closely to the second axis. Not only was this variable a component of those stimuli which were the most highly saturated in Factor II, but the one item which was standardized for Variable C alone had a higher pro-

jection on the second axis than any other item classified for the presence of a single variable. Of the five experimental variables, this one which denoted frustration appeared to be the most closely allied with the phenomenon which was represented by Factor II.

The factorial composition of Variable E stimuli (deviations from social mores, ethics, and taboos) as shown in Fig. 6 resembled those for Variables B and D with one exceptional feature. Item No. 6 appeared to be the center of a cluster of points, all representing this type of content and all having similar but nonsignificant projections on the negative pole of Factor I.

4. *Communalities*

The computed communalities as listed in Table 2 were, for the most part, low. The shared variance of individual items ranged from .086 to .437 and averaged .262 (median) for the 32 stimuli. Therefore, specific factors and/or error factors constituted the major determinants of the subjects' anger ratings.

IV. Discussion

A. Interpretation of Factor I

Factor I is identified as a dimension which is extraneous to a universe of anger content. This interpretation follows the assumption that the descriptions of excitatory situations which were standardized for five classes of content were truly representative of all possible anger-arousing content. Therefore, a stimulus such as the neutral item which was standardized for the absence of all five classes of content lies outside the domain of anger-arousing content. Consequently, Factor I, which shows the maximum correlation with this item, can also be regarded as outside the domain of content associated with anger.

This latter contention is further supported by the fact that 92 per cent of the group of subjects responded to the neutral stimulus with a nonanger type of rating. The remaining 8 per cent of positive anger ratings assigned by the same group to the same stimulus were accountable on the basis of chance. Moreover, the average anger rating and its dispersion were significantly smaller (p value of .01) for the neutral stimulus than for any other. This additional evidence suggests that subjects reacted to the neutral item according to a biasing characteristic which is irrelevant to the particular content of descriptions of excitatory situations. Also, weights in Factor I appeared to have no consistent relationship with the five experimental variables. When allowance was made for the number of words, the saturations of complex items which combined two or more types of content could not be predicted from the obtained loadings of items which represented the experimental variables in isolation. The resulting explanation of Factor I is that it reflects some extraneous characteristic of the experimental task.

B. Interpretation of Factor II

Factor II is a dimension which can be identified with subjects' anger ratings and, in turn, their verbalized conception of anger experience. This interpretation follows from the observation that the variables represented by the experimental stimuli with significant loadings in Factor II are ones which have been related to anger behavior in the psychological literature. A further indication is that the neutral stimulus which was content analyzed by independent judges for the absence of anger-arousing components was relatively isolated and located on the extreme periphery of points which stood for the regular experimental stimuli in the factor space.

Therefore, it seems justifiable to identify Factor II, which enclosed the majority of remaining points (see Fig. 1), as the common determinant which underlies an individual's evaluation of a particular situation as anger-arousing.

Additional evidence that Factor II is associated with the effects of particular anger content of items is that the variance shared with the content variables tended to be additive (partial $r = .532$). With a knowledge of the particular anger-arousing components of a given situation, it is possible to estimate with a fair degree of accuracy the extent to which anger ratings of the situation are determined by Factor II. Such knowledge is of insignificant value in estimating the effects of Factor I on the same judgment (partial $r = -.158$).

C. Comparison of Content Variables

The five classes of content can be compared in terms of their relative saturations with Factor II. Although all five variables can be arranged along a single continuum, Variable C, which was related to studies of frustration, can be expected to affect anger judgments the most. This variable had the highest loadings and the closest clustering to the second factor axis. Thus, it may be inferred that descriptions of situations wherein goal-oriented behavior is thwarted by insurmountable barriers are the most valid determiner of whether or not an individual will evaluate a stimulus as anger-arousing.

The content represented by Variable A (intense or persistent sensory stimulation) showed the least relationship with judgments of anger. Thus it appears that an individual does not assign an anger evaluation to a mere state of fatigue, or a crashing sound, or an intense but transitory pain, unless it can be associated as an interference with his planned activities, or as a threat to his self-esteem, or in some other way as acquiring a specific kind of meaning. This is suggested by the higher factor saturations of stimuli in which Variable A was one of several components rather than a single contributing component (see Fig. 2).

The remaining three Variables B, D, and E (conflict, threats to self-esteem, and deviations from social mores, ethics, and taboos, respectively) together with Variable C, all fell along the same continuum which underlay subjects' anger ratings (see Fig. 1). This finding indicates that in their rating behavior subjects fail to differentiate the content represented by the four variables. In their anger judgments the subjects seem by some process of simplication or abstraction to have interrelated the different classes of content and aligned them along a single continuum. Thus the qualitative distinctions in a universe of anger content which have been noted in the psychological literature and those which, in turn, were required of the judges in standardizing experimental stimuli, do not produce similar differences in subjects' anger ratings. Instead it is possible to characterize the common-factor content of the anger domain by one common feature and to organize it in terms of a single dimension.

The question as to whether or not Factor II may be regarded as a dimension of anger emotion in action-type situations remains unanswered. The present investigation dealt with subjects' judgments as to how they would respond if placed in an emotion-arousing situation and, therefore, disclosed the structure of anger judgments rather than of anger behavior. Nonetheless, the experimental results suggest that frustration types of situations, together with those involving conflict, threats to self-

esteem, and deviations from social mores, ethics, and taboos, should be optimal in demonstrating communalities and in revealing the determinants which underlie overt anger responses.

D. Communalities

One possible explanation of the low communalities which were found and the implied existence of fairly large specific and/or error factors was the failure to have descriptions standardized for familiarity. Definitions of content variables were such that they could be applied to a range of objects or particular situations. Consequently, subjects probably differed in the accuracy with which they could predict feelings of anger in situations with which they were not equally acquainted. However, these additional sources of variance were not sufficiently large to obscure the existence of a common dimension, this being the objective of this experimental study.

V. Summary and Conclusions

The present investigation was designed to determine the generality of anger ratings. The approach to the problem was to present 200 subjects with verbal descriptions which had been content analyzed to correspond to a wide variety of motivational situations which were reported by previous investigators to evoke anger responses. In turn, the subjects were required to rate each item for the intensity of anger which they would experience if they were actually in the situations described. Presumably if a verbalized concept of anger experience as reflected in anger ratings is a general unitary phenomenon with a single common dimension, an individual would evaluate all experimental stimuli alike. However, if a verbalized conception of anger is a more specific phenomenon, with several common but independent dimensions, some items should have been interrelated in a manner which differed from the associations made between other kinds of items. As a completely specific phenomenon, anger ratings should have showed no interrelationships. In terms of the factor analysis that was performed, generality of anger ratings should have resulted in a single, large common factor, whereas limited specificity of anger ratings should have been disclosed by two or more common or group factors, each of which could have been related to the particular contents of the experimental items. The complete absence of common variance would denote complete specificity.

Five different kinds of anger content were evaluated by 200 subjects for their relative potency in producing affective meanings of anger. Data were also obtained concerning interrelationships between the content variables themselves. This was accomplished by having judges classify verbal descriptions according to definitions of the following kinds of stimulus situations: (A) intense and/or persistent sensory and physiological stimulation, (B) conflict, (C) irresolvable frustration, (D) threats to self-esteem, and E) deviations from social mores, ethics, and taboos. The factorial compositions of each of these five kinds of descriptions were then examined to determine interrelationships.

The results of the present investigation supported the following conclusions:

1. The centroid analysis of a correlation matrix which was derived from the intercorrelations of verbally described stimuli to which subjects assigned ratings of anger resulted in a two-factor solution.

2. A method of rotation was used whereby a stimulus that had been con-

tent analyzed as non-anger-arousing had maximum correlation with Factor I. Because of this relationship, Factor I was interpreted as a dimension extraneous to a universe of anger content.

3. The second factor which emerged and which was orthogonal to the first factor had the following characteristics:

(*a*) It accounted for more than 50 per cent of the total shared variance of the experimental stimuli and was, therefore, the major common determinant of subjects' ratings.

(*b*) In addition, it entered significantly into the common variance of seven-eighths of the experimental stimuli which had been content analyzed as anger-arousing. As such, it could be regarded as a common factor which denoted a general phenomenon.

Therefore Factor II was interpreted as a single common dimension present in a universe of anger content and, in turn, judgmental anger was identified as having some of the characteristics of a general phenomenon.

4. Experimental stimuli which had been content analyzed for Variables B, C, D, and E as single determinants were significantly saturated with Factor II. On the other hand, a similar item for Variable A had a negligible factor loading. Therefore it may be said that four of the five types of content have factorial validity in predisposing subjects to view given situations as anger-arousing. Also content Variables B, C, D, and E can be related to a single continuum at the judgmental level of anger behavior.

5. Content Variable C was related the most closely, and content Variable A the least closely to Factor II. Therefore it appears that the affective meaning of anger is most likely to occur in connection with descriptions of situations which contain insurmountable barriers to the reaching of goals, and least likely to arise in connection with references to sensory or physiological stimulation.

6. It was shown that the variance which each of the five experimental variables shares with Factor II can be added to predict with some assurance the obtained factor saturations of a complex situation which combines several of these variables. These content variables, then, exhibit an additive relationship in rating behavior.

7. The low communalities of the experimental stimuli indicated that specific factors and/or error factors were the major determinants of subjects' anger ratings. Although significantly associated with the common determinant represented by Factor II, the conceptualization of anger as a response to a variety of situations seems to be largely dependent on specific or chance features of given stimuli.

Appendix

A. Experimental Stimuli

1. 0 (neutral item): You volunteer to participate in an experiment. The experimenter explains that he is trying to develop a set of standards for a learning task and appreciates your cooperation. You perform the task. While your results are not perfect, you find that the task is not particularly difficult and requires no special effort to complete.

2. A: As part of a laboratory procedure, you sit down on a chair. A firecracker unexpectedly explodes in a metal box nearby.

3. B: You have to choose between a needed pair of shoes which can be obtained immediately and a pair of shoes which you like much better but which will not be available in your size for a week or ten days.

4. C: You have anticipated attending a pleasant social event for a week. Then on the day of the event you are required to finish a long difficult examination which runs long past the time scheduled and causes you to miss the event altogether.

5. D: You perform a series of tasks which you find interesting and which you know to be measures of your intelligence. When you have completed working on them, you find that your performance is poor when compared to the average results of other persons with whom you

identify. Also your poor performance is commented on by another person who has observed the entire procedure.

6. E: You overhear a hospital patient who requests that only "sixth-generation American blood" be used for his transfusion.

7. AB: You have to choose between drinking one of two liquids, both of which taste very unpleasant to you.

8. AC: You drop in on a close friend to chat for a couple of hours. Instead of chatting, you are forced to sit and listen while she tries without success to comfort the new baby. It screams at the top of its lungs all the time that you are there.

9. AD: You receive a painful shock as you plug in an electrical appliance. Someone standing near you remarks that it serves you right for not being more careful.

10. AE: You are driving through a poor neighborhood when someone out of nowhere throws a stone through your open side window and injures you in the face.

11. BC: You go to the library for the evening to read an assigned book, but find that it has been taken out and is not due to be returned until after the assignment is due. You can try to locate some other books which cover the same material as the book assigned, or spend your time reading for other courses, or go home and consider it so much time wasted.

12. BD: You are requested to learn a list of nonsense syllables immediately after badly failing to learn a similar list within a prescribed time limit. You would withdraw from the task and avoid possible further failure, but this would prevent you from demonstrating the learning ability which you think you possess.

13. BE: You are prepared to testify at a court hearing when you receive an anonymous telephone call. You are told that your life will be in danger if you go through with your testimony. You could request police protection, but you also know that such protection is not foolproof.

14. CD: You perform a test in order to obtain a job which you need very much. You have told others that getting the job would be a "cinch." However, the test requires that you discriminate accurately pitches which frequently sound alike to you. The result is that you fail the test and are refused the job.

15. CE: You are at a big, isolated beach resort and are planning to go swimming. When you go to get ready, you discover that your swim suit has been stolen. There is no one from whom you can borrow, nor is there any place to buy a replacement.

16. DE: You and several other persons with whom you are unacquainted cooperate in an experimental procedure by writing down the meanest, most contemptible, or most embarrassing thing which you ever did. Before the procedure begins, the experimenter promises you that everything will be treated anonymously. However, as soon as you have finished, he collects and reads aloud to the others present the passage which you have just written.

17. ABC: You are caught in a traffic jam during a cold downpour on the way to the theater. You sit back and relax, thinking that you have plenty of time to get there before the first curtain. Then you suddenly realize that your watch has stopped and that the first act is already under way. You could get out of the taxi in which you are riding and probably make better time on foot for the remaining distance. However, this would mean getting wet and cold. In any case, you have missed the opening curtain.

18. ABD: At the end of the day when you are exhausted and hungry, you board a crowded streetcar or bus. However, as you get on, someone gets off and offers you his seat. A few stops up the line, two large women who look to be in their thirties get on with several large packages and stand right over you. Not only do they brush you with their parcels, but soon one says to the other, "Young people (referring to you) nowadays certainly don't have much consideration for older people." You feel that you should stand up, giving them your seat. Yet you are so comfortable sitting.

19. ABE: You are driving along a lonely country road late at night, dead tired. You come to a car which looks as though it ran off the road and tipped over. You hate to make the effort to stop and inspect the situation, yet it appears that someone is in the car who needs medical attention.

20. ACD: You stay up the better part of the night drawing a complicated map in order to complete a geography assignment due the next morning. When you have finished it and are dead tired and aching from eye strain, your roommate comes along and spills coffee all over it. The map is ruined, and it is too late to redraw it. Your roommate apologizes for the mishap, but also remarks that the map was a poor job that could be dashed off by any simple-minded person.

21. ACE: You observe a white man begin a fight with a Negro man on the street below your apartment. The police arrive and begin to take the Negro away. Since you have witnessed the whole affair, you decide to go down and do what you can to prevent the unjust arrest of the one party instead of the other. However, as you hurry down the stairs of your apartment building, you stumble and painfully turn your ankle. By the time you get out on the sidewalk, the police have left and the few bystanders have dispersed.

22. ADE: You ignore a traffic signal and as a result, you smash into another car. One of

your passengers and you are slightly injured and badly shaken up. In addition, a traffic patrolman who witnessed the incident charges you as the party responsible.

23. BCD: You have made extensive and expensive plans for a special party. The girl informs you at the last moment that she cannot come. It is too late to ask anyone else. Her reason for breaking the date could be adequate, but it seems foolish and inadequate to you. You could tell her this, but it may ruin your chances for another date in the future should you want it.

24. BCE: You have to write a term paper on a particular topic. When you go to the library to read the necessary references, you discover that someone has clipped all the articles out of the periodicals. The library cannot possibly replace or borrow copies of all these articles in time for you to meet the deadline on the assignment. You have to either prepare the paper from cursory secondary sources or change the topic to something else which is less likely to interest you.

25. BDE: A counselor accuses you unjustly of behavior which you consider indecent or immoral. Then he turns around and asks you to do him a special favor. You want to refuse the favor, but consider that this may be a way of convincing him that he was wrong in his accusation.

26. CDE: You apply for a particular position which you want very much. However, you are told that the position is not open to you, not because of any lack of skills but because of your religious views, or your sex, or your race.

27. ABCD: You are anxious to make a success of a speech. Just as you have the audience in the palm of your hand and are about to come to the climax of the talk, you accidentally stumble off the edge of the platform, painfully twisting your ankle. This creates a general disturbance among your listeners. You could go on with the remainder of the talk as planned and try to regain some interest on the part of the audience, or simply end it there with a brief remark. In either case, it is impossible at this point to rebuild the climax and make the speech the success which you had hoped.

28. ABCE: The only morning you can sleep late all week you are aroused by the building plumber. He comes in to change the faucet washers and leaves. Then, just as you go back to bed, he arouses you again, explaining that he forgot to check the radiators. This task not only involves much loud banging, but the plumber stays much longer and keeps up a verbal harangue on how "Negroes and other groups are moving in and spoiling the neighborhood." You could call the building superintendent and complain about this intrusion, but the work needs to be done. In any case, your morning sleep is ruined.

29. ABDE: While at a party, you start a discussion on religion. You soon find that your views are in the minority. One individual who represents the majority's views loses his head, probably as a result of overdrinking, and gives you a sock in the jaw. You could withdraw and prevent a further scene or hit back in order to save face.

30. ACDE: As a member of the spirit committee, you are assigned to organize a car cavalcade to give the team a big send-off for a game. You go around to eighteen fraternities and are promised faithfully by everyone that they will contribute cars for the cavalcade. At the appointed time and place, you wait for a half-hour in a steady downpour, becoming thoroughly wet, and not a single car shows up. No one cooperated with you in the way which you were promised.

31. BCDE: You attempt to raise your standing in a course by expending much time and effort on a term paper which you are required to submit. When it is returned, you find that it has been given a very low grade. You take this up with the instructor. He remarks that not only was your paper a poor one, but he unjustly accuses you of duplicating the ideas of another student in the class. You feel compelled to challenge him on this point, but this would jeopardize your course grade even more.

32. ABCDE: You are walking along a lonely street when someone comes up behind you and snatches your wallet or purse. You take off after him, but in the course of the chase, you stumble and painfully twist your ankle. The snatcher gets away. As you are trying to get up, the police come along. Instead of trying to catch up with the snatcher, they comment about how foolishly you have behaved. You would like to answer them back, but figure that silence on your part may do more to solicit their cooperation.

B. Instructions to the Subject

"Here are a set of items which describe real life situations. These items represent a lot of work on the part of other people and myself. We've had to make very certain that they meet certain rigid standards. However, we still don't know how people actually respond to the items themselves. So anything you can do to help me in this regard, I certainly appreciate. This is not a test; I am interested only in the items themselves. The specific instructions which you are to follow are on this card. I'll go over it with you." (Experimenter hands card to subject and reads aloud.)

"As you read each item, try to imagine yourself in the situation and then decide *how angry* you would feel if you were really in it. In this

experiment, *angry* is used as it is in everyday speech or experience, for example, peeved, annoyed, furious, irritated, incensed, indignant, in a rage, and so on.

"If a particular situation would leave you feeling completely indifferent or would make you feel some emotion other than anger, place the item in front of the card marked 'not at all angry.' However, if the situation would make you angry but only to a very small degree, then place the item in front of the 'very slightly angry' card. Other items should be sorted into piles according to the appropriate label cards. If an item arouses anger plus some other emotion, try to evaluate it in terms of the anger.

"This is not a test of personality or individual differences. No over-all score can be obtained. Instead, we are interested in the items and are trying to compile a list of genuine anger situations. Some precautions are:

"1. Be sure to read all items thoroughly and to consider all elements contained in the situation described.

"2. However, do not deliberate too long on any one item. If you have trouble in making a judgment, sort the item according to your first reaction.

"3. Do not be concerned about the number of items which you place in any one pile. There is no 'right number.' We are trying to study the items.

4. Some situations may strike you as humorous on initial reading. However, you are urged to refrain from laughing and to treat the items as though you were actually in the serious circumstances described."

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